

- 5 1. A metallic article comprising a metallic substrate having a ceramic coating on its surface wherein the ceramic coating is composed primarily of hafnia.
2. An article as in claim 1, wherein the metallic substrate is selected from the group consisting of steels, superalloys, titanium alloys and copper alloys.
- 10 3. An article as in claim 1, wherein the coated article is adopted to be used in environments where the free surface of the ceramic coating will be heated and the free surface of the substrate will be cooled, whereby the ceramic coating will reduce heat flow.
4. An article as in claim 1, wherein the ceramic coating has a columnar microstructure.
- 15 5. A metallic article as in claim 1, wherein the metallic article has an oxide scale on its outer surface, the oxide scale comprising alumina, and wherein the ceramic coating is bonded to the oxide scale.
- 20 6. An article as in claim 1, wherein the ceramic coating is composed of between about 3 - 70 mol. % gadolinia, balance hafnia.
7. An article as in claim 1, wherein the ceramic coating is composed of between about 28 - 40 mol. % gadolinia, balance hafnia.
8. An article as in claim 1, wherein the coating has a microstructure characterized by built up splats.
- 25 9. An article as in claim 1, further comprising:
a ceramic bond coat between the ceramic coating and the metallic substrate.
10. An article as in claim 1, further comprising up to about 25 mol. % of at least one of gadolinia, lanthana, ceria, praseodia, neodymia, promethia, samaria, europia, terbia, dysprosia, holmia, erbia, thulia, ytterbia and lutetia, or yttria, calcia or magnesia.
- 30 11. An article as in claim 1, the ceramic coating having a porosity of between about 5 - 35 vol. %.

- 5 12. A metallic article comprising a superalloy substrate, the substrate having an alumina forming coating on its surface and a ceramic coating bonded to the alumina forming coating, wherein the ceramic coating is composed of gadolinia and hafnia.
13. An article as in claim 12, wherein the ceramic coating has a columnar microstructure.
14. An article as in claim 12, wherein the ceramic coating has a microstructure characterized by built up splats.
- 10 15. An article as in claim 12, wherein the ceramic coating is composed of gadolinia hafnia oxide having between about 3 - 70 mol. % gadolinia, balance hafnia.
16. An article as in claim 12, wherein the alumina forming coating comprises an overlay coating or an aluminide coating.
17. An article as in claim 12, the ceramic coating having a porosity of between about 5 - 35 vol. %.
18. An article as in claim 1 forming a gas turbine component.
19. An article as in claim 12 forming a gas turbine engine component.
20. An article as in claim 12, further comprising at least one of the following lanthana, ceria, praseodia, neodymia, promethia, samaria, europia, terbia, dysprosia, holmia, erbia, thulia, ytterbia and lutetia, yttria, calcia and magnesia.